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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/086,543	Applicant(s) KOJIMA ET AL.
	Examiner Jeff Piziali	Art Unit 2629

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If no period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 18 December 2007.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1,2,5,12,13,30 and 33 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) Claim(s) ____ is/are allowed.
- 6) Claim(s) 1,2,5,12,13,30 and 33 is/are rejected.
- 7) Claim(s) ____ is/are objected to.
- 8) Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 23 June 2005 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. ____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date ____
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date ____
- 5) Notice of Informal Patent Application
- 6) Other: ____

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

2. The drawings were received on **23 June 2005**. These drawings are acceptable.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1, 2, 5, 12, 13, 30, and 33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claim 1 recites the limitation "***ON-state***" (in line 3). There is insufficient antecedent basis for this limitation in the claim. The absence of a grammatical article preceding the limitation renders it unclear whether the claim here is establishing a new limitation; or instead referring back to some preestablished limitation.

6. Claim 1 recites the limitation "***grayscale data***" (in line 4). There is insufficient antecedent basis for this limitation in the claim. The absence of a grammatical article preceding the limitation renders it unclear whether the claim here is establishing a new limitation; or instead referring back to some preestablished limitation. Furthermore, it would be unclear to one having ordinary skill in the art whether a single piece/element of "***grayscale data***" is being claimed; or rather whether a plurality of "***grayscale data***" is being claimed.

7. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01.

An omitted structural cooperative relationship is between "***a frame period***" (in line 3); "***a period***" (in line 4); "***a same first sub-field period***" (in line 9); "***a same second sub-field period***" (in line 10). It would be unclear to one having ordinary skill in the art whether there is a single identical ***period*** being claimed; or rather whether a plurality of separate, distinct, and ***periods*** are being claimed. Moreover, if a plurality of ***periods*** are being claimed, it would be unclear to an artisan what the differentiating relationship is between each of the ***periods***.

An omitted structural cooperative relationship is between "*one another*" (in line 7) and "*one another*" (in line 8). It would be unclear to one having ordinary skill in the art what the subject of "*one another*" in each instance is supposed to be.

An omitted structural cooperative relationship is between "*a length*" (in line 11) and "*a length*" (in line 12). It would be unclear to one having ordinary skill in the art whether there is a single, identical *length* being claimed, or rather whether there are a plurality of separate, distinct, and different *lengths* being claimed.

An omitted structural cooperative relationship is a result of the term "*each other*" (in line 13). It would be unclear to one having ordinary skill in the art what the subject of "*each other*" is supposed to be.

An omitted structural cooperative relationship is between "*ON-state*" (in line 3); "*ON-state*" (in line 17); and "*switching ON*" (in line 19). It would be unclear to one having ordinary skill in the art whether there is a single, identical *ON-state* being claimed, or rather whether there are a plurality of separate, distinct, and different *ON-state* being claimed.

An omitted structural cooperative relationship is between "*a plurality of sub-fields*" (in line 6) and "*a sub-field*" (in line 19). It would be unclear to one having ordinary skill in the art whether "*a sub-field*" (in line 19) is one of the "*plurality of sub-fields*" (in line 6); or rather whether "*a sub-field*" (in line 19) is separate, distinct, and different from the "*plurality of sub-fields*" (in line 6) as claimed.

8. Claim 1 recites the limitation "*the frame*" (in line 6). There is insufficient antecedent basis for this limitation in the claim.

9. The term "*substantially equal*" in claim 1 (in line 11) is a relative term which renders the claim indefinite. The term "*substantially equal*" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It would be unclear to one having ordinary skill in the art precisely how close two different periods would need to be to one another in length before they would qualify as being "*substantially equal*."

10. Claim 1 recites the limitation "*the first sub-field periods*" (in line 11). There is insufficient antecedent basis for this limitation in the claim.

11. Claim 1 recites the limitation "*sub-fields*" (in line 13). There is insufficient antecedent basis for this limitation in the claim. The absence of a grammatical article preceding the limitation renders it unclear whether the claim here is establishing a new limitation; or instead referring back to some preestablished limitation.

12. Claim 1 recites the limitation "*ON-state*" (in line 17). There is insufficient antecedent basis for this limitation in the claim. The absence of a grammatical article preceding the limitation renders it unclear whether the claim here is establishing a new limitation; or instead referring back to some preestablished limitation.

13. Claim 1 recites the limitation "*period of the sub-fields selected*" (in line 17). There is insufficient antecedent basis for this limitation in the claim. The absence of a grammatical article preceding the limitation renders it unclear whether the claim here is establishing a new limitation; or instead referring back to some preestablished limitation.

14. Claim 30 recites the limitation "*ON-state*" (in line 3). There is insufficient antecedent basis for this limitation in the claim. The absence of a grammatical article preceding the limitation renders it unclear whether the claim here is establishing a new limitation; or instead referring back to some preestablished limitation.

15. Claim 30 recites the limitation "*grayscale data*" (in line 4). There is insufficient antecedent basis for this limitation in the claim. The absence of a grammatical article preceding the limitation renders it unclear whether the claim here is establishing a new limitation; or instead referring back to some preestablished limitation. Furthermore, it would be unclear to one having ordinary skill in the art whether a single piece/element of "*grayscale data*" is being claimed; or rather whether a plurality of "*grayscale data*" is being claimed.

16. Claim 30 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01.

An omitted structural cooperative relationship is between "*a frame period*" (in line 3); "*a period*" (in line 4); "*a same first sub-field period*" (in line 9); "*a same second sub-field period*"

(in line 10). It would be unclear to one having ordinary skill in the art whether there is a single identical *period* being claimed; or rather whether a plurality of separate, distinct, and *periods* are being claimed. Moreover, if a plurality of *periods* are being claimed, it would be unclear to an artisan what the differentiating relationship is between each of the *periods*.

An omitted structural cooperative relationship is between "*one another*" (in line 6) and "*one another*" (in line 7). It would be unclear to one having ordinary skill in the art what the subject of "*one another*" in each instance is supposed to be.

An omitted structural cooperative relationship is between "*a length*" (in line 10) and "*a length*" (in line 11). It would be unclear to one having ordinary skill in the art whether there is a single, identical *length* being claimed, or rather whether there are a plurality of separate, distinct, and different *lengths* being claimed.

An omitted structural cooperative relationship is a result of the term "*each other*" (in line 14). It would be unclear to one having ordinary skill in the art what the subject of "*each other*" is supposed to be.

An omitted structural cooperative relationship is between "*ON-state*" (in line 3); "*ON-state*" (in line 18); and "*switches ON*" (in line 20). It would be unclear to one having ordinary skill in the art whether there is a single, identical *ON-state* being claimed, or rather whether there are a plurality of separate, distinct, and different *ON-state* being claimed.

An omitted structural cooperative relationship is between "*a plurality of sub-fields*" (in line 5) and "*a sub-field*" (in line 20). It would be unclear to one having ordinary skill in the art whether "*a sub-field*" (in line 20) is one of the "*plurality of sub-fields*" (in line 5); or rather

whether "*a sub-field*" (in line 20) is separate, distinct, and different from the "*plurality of sub-fields*" (in line 5) as claimed.

17. Claim 30 recites the limitation "*the frame*" (in line 5). There is insufficient antecedent basis for this limitation in the claim.

18. The term "*substantially equal*" in claim 30 (in line 10) is a relative term which renders the claim indefinite. The term "*substantially equal*" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It would be unclear to one having ordinary skill in the art precisely how close two different periods would need to be to one another in length before they would qualify as being "*substantially equal*."

19. Claim 30 recites the limitation "***the first sub-field periods***" (in line 10). There is insufficient antecedent basis for this limitation in the claim.

20. Claim 30 recites the limitation "***sub-fields***" (in line 13). There is insufficient antecedent basis for this limitation in the claim. The absence of a grammatical article preceding the limitation renders it unclear whether the claim here is establishing a new limitation; or instead referring back to some preestablished limitation.

21. Claim 30 recites the limitation "***ON-state***" (in line 18). There is insufficient antecedent basis for this limitation in the claim. The absence of a grammatical article preceding the limitation renders it unclear whether the claim here is establishing a new limitation; or instead referring back to some preestablished limitation.

22. Claim 30 recites the limitation "*period of the sub-fields selected*" (in line 19). There is insufficient antecedent basis for this limitation in the claim. The absence of a grammatical article preceding the limitation renders it unclear whether the claim here is establishing a new limitation; or instead referring back to some preestablished limitation.

23. Claims 2, 5, 12, 13, and 33 are rejected under 35 U.S.C. 112, second paragraph, as being dependent upon rejected base claims.

Claim Rejections - 35 USC § 102

24. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

25. Claims 1, 2, 5, 12, 13, 30, and 33 are rejected under 35 U.S.C. 102(e) as being anticipated by *Takeuchi et al (US 6,483,492 B1)*.

Regarding claim 1, Takeuchi discloses a driving method of a liquid crystal element (see Column 45, Line 54 - Column 46, Line 30) for allowing said liquid crystal element to display a level of grayscale [e.g., gradation levels 1-16] (see Column 2, Lines 4-9), said liquid crystal element displaying throughout a frame period by switching ON-state said liquid crystal element during a period corresponding to grayscale data that defines said level of grayscale (see Column

2, Lines 10-39), said method comprising: dividing the frame into a plurality of sub-fields (aka "display cycles"), the plurality of sub-fields having a first group of sub-fields [Fig. 38; unit display cycles Td1, Td2, Td3, for example] continuous with respect to one another and a second group of sub-fields [Fig. 38; redundant display cycles TD1, TD2, TD3, for example] continuous with respect to one another, the second group of sub-fields being subsequent (see Fig. 38; from left to right) to the first group of sub-fields, each of the first group of sub-fields having a same first sub-field period [Fig. 38; period U(1)], each of the second group of sub-fields having a same second sub-field period [Fig. 38; period U(4)] which is substantially equal to a sum of a length of the first sub-field periods (e.g., $Td2[U(1)] + Td3[U(1)] + Td4[U(1)]$) of the first group of sub-fields and a length (e.g., $Td2[U(1)]$) of any one of the first sub-field periods [wherein $U(1) + U(1) + U(1) = U(4)$]; selecting, according to the grayscale data, sub-fields that are adjacent to each other in a direction from a temporal position between the first group of sub-fields and the second group of sub-fields toward a sub-field of the first group of sub-fields or a sub-field of the second group of sub-fields at a position most remote from the temporal position; and driving by switching ON-state the liquid crystal element during period of the sub-fields selected (see Column 43, Lines 6-54); and switching ON of a sub-field [Fig. 38; unit display cycle Td4, for example] located between the first group of sub-fields [Fig. 38; unit display cycles Td1, Td2, Td3, for example] and the second group of sub-fields [Fig. 38; redundant display cycles TD1, TD2, TD3, for example] regardless of the level of grayscale (wherein Takeuchi discloses the sub-field Td4 provided between the sub-fields Td1-Td3 and the sub-fields TD1-TD3 is always kept switched ON regardless of a level of grayscale -- from gradation level 1 - gradation level 16, sub-field Td4 is always ON).

Although Takeuchi's "Seventh Specified Embodiment" has been relied on in detailing the above rejection, this merely serves as one example of an inventive embodiment reading on the instantly claimed invention. Other inventive embodiments of Takeuchi also read on the invention as instantly claimed -- such as, for one example, Takeuchi's "Sixth Specified Embodiment" (see Fig. 37; Column 42, Line 19 - Column 43, Line 5).

Regarding claim 2, Takeuchi discloses said first group of sub-fields and said second group of sub-fields being included in a same frame period (see Figs. 38 & 46; Column 43, Lines 6-54 & Column 46, Lines 21-30).

Regarding claim 5, Takeuchi discloses, in said driving step, a period during which said liquid crystal element is switched ON-state being inserted in said temporal position regardless of said grayscale data (see Fig. 38; Column 43, Lines 6-54).

Regarding claim 12, Takeuchi discloses said grayscale data being composed of N bits (N is an integer not less than 2) to define a level of grayscale having 2^N power kinds; high-order M bits in said N bits defining a level of grayscale said second group of sub-fields should display; low-order (N - M) bits in said N bits defining a level of grayscale said first group of sub-fields should display; and said M is an optimal solution of M given on an assumption that said frame period includes $(2^{N-M} - 1)$ first sub-field periods (see Figs. 38-39; Column 43, Line 6 - Column 44, Line 27).

Regarding claim 13, Takeuchi discloses said grayscale data being composed of N bits (N is an integer not less than 2) to define a level of grayscale having 2 to the N^{th} power kinds; a length of each of said second sub-field periods being equal to a length of a period to display a level of grayscale defined by a least significant bit in high-order M bits in said N bits; the number of said second group of sub-fields being equal to a maximum value specified by said M bits; a length of each of said first sub-field periods being equal to a length of a period to display a level of grayscale defined by a least significant bit in low-order (N - M) bits in said N bits; and the number of said first group of sub-fields being equal to a maximum value specified by said (N - M) bits (see Figs. 38-39; Column 43, Line 6 - Column 44, Line 27).

Regarding claim 30, Takeuchi discloses a driving device [Figs. 9, 12, 17; driving circuits] of a liquid crystal element (see Column 45, Line 54 - Column 46, Line 30) for allowing said liquid crystal element to display a level of grayscale [e.g., gradation level 1 - gradation level 16] (see Column 2, Lines 4-9) said liquid crystal element displays throughout a frame period by switching ON-state said liquid crystal element during a period corresponding to grayscale data that defines said level of grayscale (see Column 2, Lines 10-39), said device comprising: a dividing circuit that divides the frame into a plurality of sub-fields (aka "display cycles"), the plurality of sub-fields having a first group of sub-fields [Fig. 38; unit display cycles Td1, Td2, Td3, for example] continuous with respect to one another and a second group of sub-fields [Fig. 38; redundant display cycles TD1, TD2, TD3, for example] continuous with respect to one another, the second group of sub-fields being subsequent (see Fig. 38; from left to right) to the first group of sub-fields, each of the first group of sub-fields having a same first sub-field period

[Fig. 38; period U(1)], each of the second group of sub-fields having a same second sub-field period [Fig. 38; period U(4)] which is substantially equal to a sum of a length (e.g., Td2[U(1)] + Td3[U(1)] + Td4[U(1)]) of the first sub-field periods of the first group of sub-fields and a length (e.g., Td2[U(1)]) of any one of the first sub-field periods [wherein $U(1) + U(1) + U(1) + U(1) = U(4)$]; a selecting circuit that selects, according to the grayscale data, sub-fields that are adjacent to each other in a direction from a temporal position between the first group of sub-fields and the second group of sub-fields toward a sub-field of the first group of sub-fields or a sub-field of the second group of sub-fields at a position most remote from the temporal position; and a driving circuit that switches ON-state said liquid crystal element during period of the sub-fields selected (see Column 43, Lines 6-54); and a switching circuit that switches ON of a sub-field [Fig. 38; unit display cycle Td4, for example] located between the first group of sub-fields [Fig. 38; unit display cycles Td1, Td2, Td3, for example] and the second group of sub-fields [Fig. 38; redundant display cycles TD1, TD2, TD3, for example] regardless of the level of grayscale (wherein Takeuchi discloses the sub-field Td4 provided between the sub-fields Td1-Td3 and the sub-fields TD1-TD3 is always kept switched ON regardless of a level of grayscale -- from gradation level 1 - gradation level 16, sub-field Td4 is always ON).

Although Takeuchi's "Seventh Specified Embodiment" has been relied on in detailing the above rejection, this merely serves as one example of an inventive embodiment reading on the instantly claimed invention. Other inventive embodiments of Takeuchi also read on the invention as instantly claimed -- such as, for one example, Takeuchi's "Sixth Specified Embodiment" (see Fig. 37; Column 42, Line 19 - Column 43, Line 5).

Regarding claim 33, Takeuchi discloses electronic equipment, comprising: a display device, including a plurality of driving device driven liquid crystal elements aligned in a matrix, that displays an image related to said electronic equipment (see Figs. 9, 12, 17; Column 45, Line 54 - Column 46, Line 30).

Response to Arguments

26. Applicant's arguments filed 18 December 2007 have been fully considered but they are not persuasive.

The Applicant contends, "*Independent claim 1 recites, inter alia, 'switching ON of a sub-field located between the first group of sub-fields and the second group of sub-fields regardless of the level of grayscale.'* *Independent claim 30 recites, inter alia, 'a switching circuit that switches ON of a sub-field located between the first group of sub-fields and the second group of sub-fields regardless of the level of grayscale.'* *Support for the amendments can be found in the specification at, for example, Fig. 10 and paragraph [0020]. Takeuchi [US 6,483,492 B1] fails to teach or suggest the switching ON of a sub-field located between the first group of sub-fields and the second group of sub-fields regardless of the level of grayscale. Accordingly, the applied reference fails to teach or suggest the recited features of claims 1 and 30*" (see page 6 of the Amendment filed 18 December 2007). However, the examiner respectfully disagrees.

Takeuchi discloses switching ON of a sub-field [e.g., Fig. 38; unit display cycle Td4] located between a first group of sub-fields [e.g., Fig. 38; unit display cycles Td1, Td2, Td3] and a second group of sub-fields [e.g., Fig. 38; redundant display cycles TD1, TD2, TD3] regardless of a level of grayscale (see Column 43, Lines 6-54). Wherein Takeuchi discloses the sub-field Td4 provided between the sub-fields Td1-Td3 and the sub-fields TD1-TD3 is always kept switched ON regardless of a level of grayscale. From gradation level 1 to gradation level 16, sub-field Td4 is always ON (see Fig. 38).

Although Takeuchi's "Seventh Specified Embodiment" has been relied on in detailing the above rejection, this merely serves as one example of an inventive embodiment reading on the instantly claimed invention. Other inventive embodiments of Takeuchi also read on the invention as instantly claimed -- such as, for one example, Takeuchi's "Sixth Specified Embodiment" (see Fig. 37; Column 42, Line 19 - Column 43, Line 5).

By such reasoning, rejection of the claims is deemed necessary, proper, and thereby maintained at this time.

Conclusion

27. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeff Piziali whose telephone number is (571) 272-7678. The examiner can normally be reached on Monday - Friday (6:30AM - 3PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bipin Shalwala can be reached on (571) 272-7681. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jeff Piziali/
Primary Examiner, Art Unit 2629
18 March 2007